Chemistry Librarianship – How do you Measure Up
Research Study Focus Group Transcription

4 focus groups, 8 participants

5 questions

July 18, 2024

Preliminary discussion

[Participant 2]
… my name is [Participant 2]. I am the earth and ocean science, no sorry, earth science. Earth science, chemistry, math, physics and statistics and actuarial science Librarian at [academic institution]. I've been in this role kind of on and off since [date]. I did have some leaves and then I also was acting head of my division for a while. What did I do before this? It's been a long time. I worked for the [institutional name]. I worked for their library here in [place name]. So, all my jobs beyond co-op have been based in [place name]. Anything else that I missed?

[Facilitator]
I think that's great. And we'll get into other stuff as time goes on too, but that's a great intro. Alright, [Participant 1], do you want to introduce yourself now?

[Participant 1]
Sure. Hi, my name is [Participant 1]. I'm one of the "Science [name]s" over at [academic institution]. So, I've been at that campus for I think about eight and a half years now, doing a variety of different science buckets over the years. Throughout the entirety of my time there I've been our psychology and neuroscience person and for the last, just under a year and a half, I've taken on our [STEM department] portfolio. So that's the [STEM department]. That includes chemistry, environmental science, environmental studies, as well as physics. In terms of my educational background, so I majored in experimental psychology, so that was a very natural fit for me. But I have very little background in kind of the hard-physical sciences. I took a Grade 10 chemistry course and that was about it. I had some biological sciences background for my undergrad before I switched to psychology. So, a bit of a mix of sciences there, but in terms of my librarianship focus that was more on the health sciences side of things. So, I've worn a few different hats over the years, but I'm coming more into the chemistry role in the last year and a half, I would say. So, anything else?

[Facilitator]
I think that's a great start. So now I'm going to just share my screen because we have some slides that we prepared for this. Are you seeing a slide deck? So yeah, thank you so much for being part of one of our focus groups for this study, which, our sort of research question that's been guiding us is how do academic librarians provide effective chemistry instruction and support while retaining current disciplinary knowledge and expertise, very broad, but we'll get into some smaller questions as we go on. And these are my co-investigators [names and institutions]. So, we're working together on this project. There we go. Yeah, and these slides I'll show you share with you a little bit about what we've done so far, and some of our findings up until this point. So, to start out our study, we did a survey that we sent out to 64 academic librarians at 59 Canadian institutions that we identified as covering chemistry in some way. And we had a great response rate, 75%, which we were really excited about that. And now our second stage of the study is to be conducting these focus groups of which you are one. We're doing four, each with two Participants and one of us facilitating so thank you for contributing to this kind of second stage for our study. So yeah, a little overview of the Participants. We kind of had an interesting spread of years of service, but on average, we were at about 10 years. Our mean was eight years. So, lots of folks' kind of in mid-career, but we had people who'd been working as long as 32 years and who'd been working as little as quarter of a year when they completed the study...

[Facilitator]
As far as institution size, we had a variety of sizes as well, some smaller institutions, a few much larger institutions that of course, many falling kind of somewhere in the middle. And what was really interesting to us was sort of where people were coming from in terms of their subject background. So, the institution's highest

chemistry degree we we're looking at was a lot of the institutions had up to PhD folks and Master's folks as well but some just Bachelor of Science.

[Facilitator]
Okay, now we get to what their degrees were. So, we had four who had actually chemistry-specific degrees of varying levels. And we had a bunch of people who had some level of STEM background. 29 folks had at least one degree in science or STEM but not necessarily specific to chemistry. And then we had a bunch of folks who were non-science folks from their background, with a variety of different things that they had studied in their undergrad and other degrees. So, history, English literature, humanities, experimental psychology. So yeah, there were 12 folks there.

[Facilitator]
And then these are just a few interesting quotes from that we got from the survey. So, some folks saying that they don't really have a chemistry background and that makes them a bit hesitant to get engaged. And others acknowledging that you know, if they did have a background in chemistry, they feel their role might be easier. But then some folk's kind of saying that, you know, they're familiar with some things but maybe just not at an advanced level.

[Facilitator]
So then, in terms of confidence, we asked about both chemistry education, and chemistry research, how confident folks are supporting education and research. So, lots of people falling in the middle. But what's interesting is that, as we go to chemistry research, people are a little less confident. So, we had kind of, oh and I'll go back here, we had more folks falling on the lower side of the scale when it came to research. Moving down from fours. Yeah, moving down from fours to ones here. So that's sort of interesting.

[Participant 3]
I'm Participant 3. And I am a librarian at [Name University]. I do chemistry, chemical engineering, and physics. And I've been a STEM librarian for about 30 years now. And I've worked in several universities. And then my background is actually in history and international relations. So, I do not have an engineering background or a science background.

[Participant 4]
I'm, Participant 4. My background is metallurgy engineering. I have a Masters in Metallurgy Engineering. In [Country] I was a university lecturer for material science and engineering. And I come here and had my degree then my first job I got was in [Company and city names]. And then I went to [Name University] as a liaison librarian for chemistry, chemical engineering, materials engineering, etc. Since, I think, at the beginning. Then you know we have switched to functional groups then I was a teacher learning librarian at [Name University], still covering stem. Now I come here at [institution name[. I'm now covering engineering. I'm the librarian for the Faculty of Applied Sciences.

[Participant 8]
…I'm here is because I know [name] quite well, and so I have a very non-traditional career. So, I used to be an academic STEM librarian so pretty much any chemistry or any science or engineering subject I've done it. I was at the [academic institution], [academic institution], and also the [academic institution] … So, I left the profession and so I just recently came back. I worked at the [academic institution] for six months where I was the chemistry, statistics, math and physics librarian just to see what's changed since I've been away from the profession. But while I was away, I worked freelance. So, I worked with a lot of chemistry faculty in the area of patents and also in a lot of data analysis and machine learning applications, a lot of data science stuff. So, I do have a background in chemistry. I have a master's degree in inorganic chemistry and I worked in a bunch of organometallic labs with big famous guys. so that's sort of like I have sort of a traditional background, but then I have a very non-traditional background. And so, I just finished my contract at the [academic institution], and so now I'm back to working in machine learning again.

[Facilitator]
Are you enjoying that transition back to machine learning or do you feel like you would like to go back to an academic library? Or undecided?

[Participant 8]
I noticed the only change coming back from being an academic Librarian is how much data science is involved now in chemistry. So, at the [academic institution] there they put on a really amazing lecture series from the chemistry department. And so, I attended all the lectures and I found myself asking machine learning questions, looking at machine learning graphs like that sort of thing. So, it was a lot more of a focus on kind of data

analysis then sort of reaction mechanisms or organometallic stuff that I did more of in my previous academic life.

[Facilitator]
That's a good perspective to have as well.

[Participant 7]
Yes, so my name is [Participant 7]. I guess my title now is electronic resources librarian. So, primarily I would say my focus is on managing electronic resources. The entire collection, but we still have a liaison model at [academic institution]. So, I'm also the librarian for chemistry, biology and biomedicine. I've been at [academic institution] for six years now… so nice to see you again.

[Participant 7] My role is kind of evolved over the years but I've always retained kind of liaison responsibilities for biology and chemistry. I think it's important to note that we are about to do some restructuring at [academic institution] where we're moving away from the liaison model and we're going to move into more of a functional model. So, it's actually kind of interesting to really contemplate what this will mean for service to chemistry departments so, yeah, I guess its kind of where we're at, right now. That's kind of me but yeah looking forward to our conversation.

[Facilitator]
And again, thank you both. It is interesting to those different. Models and sort of what is happening at each Institution. And how it ebbs and flows.

[Facilitator]
Okay, so as a reminder we're looking at the ideas of how do academic Librarians provide effective chemistry instruction while retaining current disciplinary knowledge and expertise... So, our survey ended up going out to 64 academic Librarians at 59 institutions, with about a 75% response rate, which was great and we have four focus groups with four facilitators and eight Participants of which you are two. So, thank you! Of the survey Participants there's a minimum of 0.25 years of service, the mean was around eight, the average of 10 and the max being 32 years. Some ranges there.

[Facilitator]
One of the questions we asked was what was your academic degree in addition to your MI? And so out of 45 responses 4 were chemistry specific, 29 had at least one degree in stem and there's 12 that were non-science. [Participant 7], what is your academic background?

[Participant 7]
So, I have a bachelor degree in biology and cognitive sciences. So, I did take the first four fundamental chemistry courses as part of those requirements but I didn't minor in chemistry.

Question 1
Survey results indicated that librarians from smaller institutions, those serving on functional teams, and those from institutions with less than PhD chemistry programs are less confident providing chemistry education and research support.
Can you comment on this?
Does this resonate with you?
How might being less confident make librarians feel?

[Facilitator]
So yeah, that brings me, with a little bit of background on what we've found so far, to my question for you, my first question for you. So, our survey results more broadly indicated that those from smaller institutions, those who might be serving on functional teams, from institutions who have less than PhD chemistry programs as their highest degree, all of those folks, on the whole, seemed to be less competent, providing support with chemistry, education and research. So, it'd be interested to hear any comments you might have on this whether you feel that this resonates with you. What are your thoughts on this result? I'll give you a minute to think about it as well. Happy to go back to any of those results too, if you'd like to see them again.

[Participant 2]
I think it's interesting. I don't, I'm not in any of those situations. Like I'm not at a small institution, we have PhD programs, I'm not on a functional team. So, I feel like my comments are purely like academic. Like theoretical. I mean, I can see people who have, you know if you're in a smaller institution or you have like just potentially less practice or less demand to develop those skills that you wouldn't be as confident right? Like, if it's not your primary job, because you're, you know, your part of a team that's doing a bunch of other things. That all seems reasonable to me.

[Participant 1]
Yeah, I would echo the demand piece. So, the less I hear from folks, the more I feel like I should be investing elsewhere, just based on where I'm getting questions from, where I'm getting teaching requests. That kind of resonates for the physics piece of my portfolio, I get like one or two questions a year, versus chemistry or environmental sciences. So, I feel more of a need to put my energy into that. And even for like the smaller institutions piece, I'm just wondering about like support to gain proficiency and confidence in those areas. Like at [academic institution] we have a great network here where I work with other science liaisons, I connect with other chemistry librarians across our [campus]. That has been so instrumental in helping me grow in this area where I do not feel confident at all. So, I could see how maybe having that lack of support system at a smaller institution could potentially be a reason why that might come up as well. And can you reiterate the functional teams' piece?

[Facilitator]
Yeah, yeah. So, we kind of, sort of connected the different responses to see how that impacted people's confidence. And for functional teams, that sort of the type of people who were in, maybe they're a teaching, a STEM teaching librarian or just a teaching librarian and they have more of a functional role. We're seeing folks move, we're seeing some institutions moving sort of more towards this model, versus the more subject-specific like you're the liaison for X subject model. So, some folks who are in that model felt that they were less confident as a result because they might be covering lots of different subject areas and providing teaching support, for example, for all of those subject areas versus being able to focus on fewer subjects or, or one particular subject if they're very lucky. Yeah.

[Participant 1]
Yeah, that makes sense. Divided attention and just conflicting priorities. I could see how that would be the case as well compared to like a dedicated liaison this area, who is able to maybe have more time to specialize and learn the lingo, so to speak. Yeah, that definitely resonates.

[Facilitator]
I mean, and on the flip side, if you're not in any of these situations, thinking about or if you have comments on whether being in a large institution or being able to be a subject specialist, or in institutions with PhD programs, why that might make you more confident or if that resonates, I guess. That's fine too, as a way to approach it.

[Participant 1]
I do feel more pressure, being like a chemistry librarian without that subject expertise. So maybe it's a bit of the opposite, even though it's a bigger institution at [academic institution] and we do have that support, I do feel like I need to have that expertise. Even though like I've tried to give myself grace and say, at the end of the day, I'm there to teach them skills to implement with, you know, searching databases and understanding what tools are available. How to form keywords, that kind of thing. So I will defer to them as the experts whereas I'm just there

to kind of guide them through the process, but I feel like having that expertise does get more buy-in and it helps me to loop into things that might help them more or like extend my capacity to help them so it's kind of a balancing act in the first year and a half that I've been doing this role, is giving myself time to gain that expertise, but also being like it's okay if you don't know everything. That's not necessarily what you're here to do.

[Facilitator]
Yeah, I feel like PhD students, you know, they might have more complex questions if you have PhD programs. Sorry, go ahead [Participant 2].

[Participant 2]
No, I was just going to agree. I have a science background like I have a BSc in Earth and Ocean Science. But that was a long time ago. Right. And I haven't used it, and one thing that I tried to remember is that like, PhD students in chemistry in like organic chemistry, can't talk to PhD students in inorganic chemistry, and like understand each other. So, I think that's really, that sort of is a like, calming or like something I do to make myself feel better where I'm like, I have expertise in how to find things. But like, I'm just never going to have their expertise in chemistry. And that's fine. Right? Like, you know, my yeah, my expertise is in, is in finding things and kind of figuring out these tools, even if, ultimately what I need to do is like, either have them with me or like bounce back results back and forth and back and forth, because I can't really interpret them. Like thinking about the, the two results where people felt more confident teaching than they did helping with research questions like that really resonated with me. I can teach people how to use SciFinder like how to use, whatever, right? But when they are like, I'm looking for this really detailed thing, like, that's, that's when the chemistry really hits. I don't, I don't understand. Yeah, but I'm really clear about that with students and faculty, right. I'm like, listen, this is where my knowledge ends and where your knowledge steps in. This is what makes us a team.

[Participant 3]
I can certainly understand why people from smaller institutions might be less confident because typically as smaller institutions you have to cover a broad range of programs. If you're doing chemistry, and I've seen STEM librarians covering humanities programs, if you have a broad range of things, you just won't have the time to kind of study and learn in the program or the research going on. And then those from functional teams. Yeah, again, because functional teams don't encourage, they actively discourage librarians from developing relationships with programs, right? You're not going to be encouraged to go and talk to chemistry faculty and grad students and go to the departmental seminars and things like that because you're on a functional team. So, I can certainly understand why those librarians would feel less confident.

[Facilitator]
Do you have an opinion about research versus just education support?

[Participant 3]
I think education support is easier because you're talking more about pedagogy, right? That's not specifically about chemistry. Chemistry pedagogy is a little different than other pedagogies but a lot of the pedagogical tools in your toolkit you could apply across different programs.

You have to be comfortable with talking to researchers, post-docs, understanding the vocabulary. What fields they're working on. And again, that takes time to learn if you're not a chemist or don't have a chemistry background. You can pick up that vocabulary over time but you have to have enough time in your day to learn and to go to departmental seminars and lectures and things like that.

[Participant 4]
I agree with Participant#3 in terms of the functional teams because, just like [Name University] changed from the liaison model to functional model, when we hire librarians we don't look at the backgrounds, like academic backgrounds. If we hire a teacher learning librarian, we just look at the pedagogy part that applicants already know. Even the role may be for chemistry, for STEM, but actually the candidate won't be examined in that part. So yeah, I understand for functional teams. Some librarians are less confident because then they enter the institution and they actually don't need the background, don't need the experience in chemistry. In terms of chemistry education and research support I think I understand why, because like research support you don't know how deep or how complex the question will be. But if you just teach students how to use SciFinder to find something, you can give your own examples. But when researchers come to approach us, they may have something specific. They already searched in some resources and they couldn't find it. This requires more knowledge and more search skills. I feel some librarians may be not confident with the research part. But the education part should be easier. Basically, from my experience at [Company Name] I found at academic institutions we try to teach researchers how to use resources, but in the special library we try to find the information and give it to them. So, we need more knowledge and experience in the field.

[Participant 6]
Yes, it does for me [being less confident providing chemistry education and research support]. I think [institutional name] is just on that border now. We're a little over 10,000 students so we are just making it into that medium size university. I still think of us as a smaller institution with PhD and Masters programs, but not specifically for chemistry. So, I would say yes, that I'm less confident and I don't do a lot of instruction in chemistry. You know, it's getting better. There were years when I did nothing at all. And in more recent years I've been working with fourth-year instructors, but the focus is typically on Web of Science and its literature. We're not doing anything beyond that although we have Reaxys and SciFinder-n and those resources. I can use them to find literature, but I would not be confident in approaching that literature thoroughly, let's say like structure searching and that sort of thing.

[Participant 5]
That's giving me a little bit more confidence in instruction. Umm but yeah, I do have a biology background so that I have a science degree it was biogeography. So, we've got a functional [organizational library] structure here. And I'm here at the [institutional name], and I don't have a degree in chemistry. I have a degree in English literature. So, I'm probably *that* person. "So how could I support chemistry students with no formalized chemistry background?" I did almost 10 years working in biomedical clinical support units… I worked for the government as a pharmaceutical policy analyst… for the Government of [province name], so I have had on the job jobs and not back down jobs.

[Facilitator]
How does that make you feel either of you? Do you feel anxious or confident? I'm curious to see what words you use [to describe how you feel about your level of confidence.]

[Participant 5]
So I'm confident and nervous because I can follow [chemistry-related] conversations. I know what's happening. So, and that's been proven out over time and complexity and different settings, but I don't have a [chemistry-related] background. Every once in a while, something will come up that's super basic that nobody talks about because it's super basic and I'll go "oh wait a minute" and I have to go and check. I'm ok if I do know [something] that's not burned in... That's the experience, the perception of my capacity and confidence around the literature and the [chemistry] lingo.

[Participant 6]
I would say the same. A bit of both and it might depend on what class I'm working in or who I'm working with. I've learned over the years to try to be as transparent as I can when I'm working with faculty, and that's helped because initially when I didn't know. I didn't want to let them know that I didn't know. You know? So over time I've developed more confidence and say, "Ok, I don't know anything about this topic. You're going to have to help me. You know what? Umm, what topics can I cover? Give me some suggestions. What's that about?" And so that's helped me a lot.

[Participant 5]
That's giving me a little bit more confidence in instruction ….I do have a biology background so that I have a science degree it was biogeography so a little bit away from chemistry I did date one day think that I was going to be a chemist but that left me as soon as I got deep into chemistry and I became afraid of chemicals ….That all left me - been years that even by the time I became a librarian it's been years since I've been an undergraduate science student. I have a little bit of background, but if words are familiar …. So, as I mentioned, I'm just gaining some confidence over the years in, in working with faculty and having the confidence to say I don't know.

[Participant 8]
I guess I'm not the best person to answer this question. I've never not felt confident doing chemistry information literacy instruction. The harder and weirder it is the more fun. It is for me. I love looking at someone's reaction and going "Wow, that's awful. you're probably going to catch on fire. That's really toxic. So glad I'm not doing this anymore"

[Participant 8]
[Academic institution] chemistry department and the library do not have a strong relationship. So that was one thing that I came in to fix. And a lot of that was just kind of showing up and adding value. How can the library add value? Because the chemistry department was already getting all the things that were important to them, people were getting tenure people were getting promoted grad students, were graduating, they were getting grants. So, if the library isn't involved in that process and the chemistry department is getting all the things that

are important to them. How do you come in and show from the library perspective that you actually do have value, right? So that's kind of where I came in.

[Participant 8]
A big part of that was me attending the lecture series for the seminars. And so, I always made sure, I sat in that lecture room and I asked every presenter a really thoughtful question.

[Participant 8]
The department didn't really connect me with the library. They just saw me as someone with value who was super interested in what they were doing and could add value. So, then they asked me to come to their graduate research day because they wanted the person from the seminar to come and ask questions of all the grad students. So, they still never connected me to the library until I spent six hours with them. And everything I said was "hey, it's [Participant 8] from the library. Here's my question." and so I think if you have a long lack of relationship between the library and the chemistry Department. Then you have to figure out a way to add value because if you don't add value, you're probably not coming in to do any of this kind of instruction.

[Facilitator]
That makes sense. It's an interesting perspective from sort of like the opposite. It sounds like you're someone who can be very confident with your knowledge and your experience.

[Participant 8]
I can only speak from [academic institution] perspective, but I noticed that several of the faculty were coming in from industry. So, the fact that I work in patents as like my real job. And so, in industry, everything is primarily patent-driven, right you're thinking about where the patent is coming down that research chain. and so previous academic institutions I worked at, patents were not as important.

[Participant 8]
And if you take a look at the literature from other [academic institution] in that, they said that faculty didn't use patents and that sort of thing and I noticed that shift at the [academic institution] and I have to admit if I was coming from a small institution and I didn't have a lot of experience having to talk about patents is something that's tough unless you really work in them because there are a lot of nuances and kind of details. That I wouldn't have been able to talk about if I didn't work in it the way I do now.

[Facilitator]
It makes sense. Its very value added. I can see that

[Participant 8]
I'm kind of not really directly answering this question, but I don't know if you don't have that relationship then how are you coming into the classroom or whatever to do instruction or coming into the research group? I can definitely relate if you didn't have a background, how are you going to build that relationship? How are you going to show that you have value to provide?

[Facilitator]
So, how do you think that would someone who doesn't have that? How do you think the librarian might feel if they were giving your job without your background?

[Participant 8]
I've been a librarian in a lot of STEM subjects and I can do it. But I always thought chemistry would be really challenging because if it's its own vocabulary, right if you can't structure search or do a retro synthetic analysis, I don't know, I answer those types of questions. I don't know if you don't have a background, do you just not hear those questions? Do you refer them to somebody else? I don't know man.

[Participant 7]
Yeah, I mean when I look at this I think we're kind of serving already on functional teams, perhaps, but we also I guess connect more… We've been liaison on model. We're also relatively smaller Institution. We are also an institution that has PhD chemistry programs.

[Participant 7]
So, I guess I'm talking about my confidence in providing chemistry Education and Research support. I think poor confidence when it comes to chemistry education, but research supports a little bit more and I think that comes from one being able to build those relationships similar to [Participant 1], [academic institution] has chemistry department that has regular Research Symposium, and I attend those to just kind of make my face known, build those relationships, but what I've done personally is lean more into the research support side of

things that are kind of outside of literature searching. So, a lot of the support that I've given in the past have been around Open Access and around Google metrics and research profiles, ORCID because those are the types of questions that people in our chemistry labs are really having for me. I do provide chemistry reference supports, I've taken up to the second level of organic chemistry, right, in undergrad so I have some familiar with nomenclature and basic understanding of chemical reactions and so on so I can provide some basic reference support and kind of using SciFinder and navigating things kind of a basic level in chemistry, when it comes to finding more traditional reference support by articles to search databases. That's kind of not a problem at all. But I do feel less confident when it comes to answering say more nuanced reference questions around chemistry research but those don't really come my way that much., I'll say I also work with the chemistry department on a lab that occurs in the first year chemistry course where the focus of one of the labs is on information literacy and searching so, that's kind of the intervention there for undergrads and also later on in the fourth year for their research projects for the research for the thesis-based course where I provide some information literacy, but again, it's kind of more I would say subject agnostic, I mean the labs I would say are focused on SciFinder. But by the time they get to the fourth year, I'm starting to introduce and talking about things relating to Open Access and Publishing and things like that. So, I'd say, confidence around providing chemistry education for sure, but around research supports, I'm pretty cool. I'm very confident I'd say but that's support is very much focusing on kind of again subject agnostic, areas that libraries kind of champion which again open access, publishing, research metrics things like that, but with the change and I guess I learned all that because to me that the need that was coming from the chemistry department and as a liaison librarian I took on that responsibility of learning it with the upcoming restructuring where we'll now have functional teams. Let's say we have a functional team that now focuses on Open Access, that's going to be interesting because they will now have made that, build those relationships.

[Facilitator]
That does make a lot of sense and the idea that you can be very much more confident in some areas depending on where you're coming from and less so in others. It will be interesting perhaps to think back on this in future, speaking now when you're right on the precipice of a new reorganization.

[Facilitator]
To one of your points [Participant 8], how do you answer those questions? In my experience, I don't get those questions. So perhaps they're going somewhere else because they're aware that I don't have that level of chemistry knowledge…

[Participant 8]
I mean, I will say, I also see it a lot in freelance because I have a lot of academic clients. Right, so they're coming especially from US universities, so, I don't know what that says about, that's a whole separate question. So, I have academic clients coming from big Universities who theoretically have liaison Librarians, but I'm being hired to do these kind of literature searches, right?

[Facilitator]
Interesting. Do they ever mention the library? I'm thinking around the idea of capacity and things like that.

[Participant 8]
I signed non-disclosure agreements so I can just say, especially from the US universities …but the questions that I get are incredibly complicated, there is a reason like that I'm being paid to solve a particular problem for sure. Yeah.

[Facilitator]
Yes, that makes sense.

Question 2
How might an academic librarian's confidence in providing instruction and support change over time with more experience, knowledge, and expertise?
Can you give an example?

[Facilitator]
Yeah, yeah. I think that brings us well to our kind of next question, which is, yeah, back to that academic background and professional experience piece of things. So, we also gave people an opportunity to write out a little bit of how they feel that their background and/or experience helps them with supporting the education and research. So, some folks emphasized education, and almost, slightly less, but an almost equal number emphasize their experience. And some even specifically spoke to their experience outside of academia, which was interesting. We had 13 folks say that both education and experience were important. Some admitting they felt like they might fall short. And a few actually spoke to how they stay up to date as well. So, a few interesting quotations I'll just share for you. So yeah, this person talking about how their research experience they feel helps them more than their training as a librarian. On the flip side, somebody else talks about how they think it's certainly possible without the education background, as long as they're willing to kind of spend the time, or able to spend the time and invest that time to develop their confidence and their expertise. And then another person mentioned that just generally being comfortable with science helps them to support, and not necessarily the chemistry-specific stuff. A few other ones, just someone at a small place where they're stretched very thin, and then another person admitting that they suffer from impostor syndrome sometimes, whether other folks are hesitating to ask them for help. But you know, they're doing the best they can for what they have. Yeah, so jumping off of that, how do you feel like an academic librarian's confidence in providing instruction and support might change over time with experience, knowledge, and expertise, and also did any, any of those results sort of resonate with you? Do you have comments on those?

[Participant 1]
I guess I could speak to just my experience being in that first year and a half role and how confidence has changed. So, when I first started as a chemistry librarian, I had about a month and a half to onboard just in terms of knowing the resources as well as trying to get just the most baseline of lingo available. And the only reason I felt I was able to do that was because I had previous liaisons' materials to build upon and the [academic institution] colleagues to call upon to be like, does this example makes sense? Like, what's a compound, what should I be searching in SciFinder? Just like these basic ideas that I had no idea how to do. But once I started to understand the tools and what examples made sense within them, then I felt a lot more comfortable navigating those resources myself and being able to demonstrate them. And the more I taught with students and interacted with them, the more I was able to feel like okay, this is going okay. And I can iterate and I get feedback and I see what works and what doesn't each semester that I teach this so I'm able to kind of build upon what I have. And I'm also really an advocate of getting like reflective feedback and integrating that not only for future courses but into additional teaching beyond that live session. So, I have like workshop FAQ pages I built on my LibGuides, for example. That helps me to kind of continue to interact with students beyond the session to answer their questions. So that gives me a sense of like, what is it that they feel they've learned really well? What areas are they still feeling maybe less confident in? And that helps give me direction as a liaison and be like, okay, here's what I can focus on, and prepare for ahead of time next time. So, if I feel like I have gaps in those areas, I can build upon them before I teach the next iteration. So, I feel like it's, I don't know this is, I guess that speaks to the experience piece and knowledge, expertise I don't feel like I can talk to all that much yet, because I'm still developing it, but it's like anything. It's, you don't have to get it perfect the first round. Don't expect perfection of ourselves or our students and kind of grow together, has been my approach thus far. Might have more to say I'm going to pause and think a little and pass it on if there's other thoughts.

[Participant 2]
And I'm kind of at the other end, like where I've been doing this for a long time, but I've also just realized that like, that just goes on forever. Right? Like, there's no end and there's no point where you're like, yep, I know, my expertise is solid, like, there is, we always discover something new or some interface changes wildly. And you realize that you, everything you knew was kind of based on like this one little structure that you built in your mind, and then, it's kind of knocked out from under you. And so, I think for me, you know, my confidence in providing instruction and support is probably true for any liaison in any discipline, right? Where you just, you come to accept that like things are going to change and you have to roll with it. And so, you gain more confidence in, in not knowing everything. Like I felt like when I was new, I was like, okay, I have to learn all these tools and I have to like know them inside out and backwards before I can teach them or before I can, you know, help people use them and yeah the more experience I have, the more I realize that like I'm never going to know them all inside out and backwards. And I just have to be okay with that, right? You kind of have the confidence to go anyway, right? And be like okay, like, we're going to learn this together today. And be like oh, this changed since I last did this you know, like, let's figure it out. And I think that actually resonates better with

students anyway, that, you know, they don't want to sit there and listen to someone pontificate about everything they know. They want to see that people struggle. You know? But that we can adapt.

[Participant 1]
Like, having confidence to be able to let go of that control. Just like life comes at us sometimes and we have to adapt on the fly. And that's a good skill to learn.

[Facilitator]
To admit what you do and don't know?

[Participant 2]
Yeah. You know, and that we're all learning this and that there's no like expert. I find that science students, well probably students in general, my experience is with science students, have like a feeling that there's an answer, right? And there's the way of doing things. If they if they're not doing it right, then they're doing it wrong, right? If they're not getting the, what they consider to be the perfect results then they've done something wrong. And so, like I find modeling sort of that flexibility helpful for –

[Participant 1]
For the messiness.

[Participant 2]
Yeah, and that it's messy and that that's okay. Right? Like there's not like an answer key in the back of the you know, Cambridge Structural Database telling me whether you searched the right thing.

[Participant 4]
When I just became an academic librarian, at that time I focused on feeding students the knowledge points or something, how to search in the database, etc. I did have hands-on activities for them but later I felt my strategy was not good. Because over time I learned a lot in the academic institution and also through professional development I think I have developed more experience and expertise in how to teach, how to effectively teach students using the resources. Yeah, in terms of pedagogy.

[Participant 3]
I would say, and this applies to any type of librarian, you're never going to develop confidence if you're not in love with the subject you're serving. So, if you don't care about chemistry, if you hate chemistry, if you had a terrible high school chemistry course and it scarred you for life, that's going to be really hard to overcome. So, you really have to be prepared. You might be a little scared to take on a chemistry role if you don't have a background. But if you're curious about science, if you're curious about technology, and you're enthusiastic about learning then you can overcome that imposter syndrome. But if you just don't have any interest in the subject then, yeah, it's going to be really hard. I mean, I would be a terrible agricultural librarian because I do not care about agriculture. I like to garden, I have my little vegetable garden, but that's the extent of my interest.

[Participant 6]
Well, I think as I mentioned just that confidence to say I don't know and that helps with the learning, umm, we are not a functional model here. I'm a subject librarian, you know. That's, but we all have functions, so I kind of think we're both, but I think you know working with those like groups like the chemistry library and group, you know that's definitely helped me a little bit. You know, just having going to some of those sessions and that sort of thing, that's changed things for me over time because you don't feel quite as alone.
[Participant 5]
I would agree that being the sort of community of practice for using that term, it makes sense.
Makes a ready crowd to ask a question and a relatively safe crowd, but it's also, but that's not a thing I've availed myself of, but I take comfort in the fact that it's there and I can do it. I feel like I could do it. I mean, uh, I've only been a librarian for 10 years. This is not my first career. My career before this was I was an administrator and dealt with healthcare complaints. And then pharmaceutical policy analyst analysis, whatever. So, I had it for me. It's asked backwards. I had all the experience and then I came and they said, hey, chemistry and I'm like, I don't have a chemistry background and then it turned out I kind of did. I had enough of a background to translate chemistry into librarian speak and back and forth. This is all I needed because I needed to be the translator because the students need what the students need and library and speak whatever librarians speak. And if I had enough of each, which I seems like I have had, mostly not always, so that's worked [as well]. With that experience, you can get on the job training. Like, once you're supporting chemistry library and chemistry students and faculty for a while, you begin to know your own programs and know you've got a fair bit of context before questioning even hits you because of who's asking it where and under what setting. That helps my confidence if I sort of [know] a lot of that context already. I'll feel more confident in my answer, but I also feel

more confident getting chased. A [research] question which can sometimes be intimidating, maybe fuller semantics than you're looking for.

[Participant 7]
That's interesting. I mean I would say even at the beginning when I first started I definitely had a lack of confidence. I mean, it was also right out of Library school and I mean to me like I did undergrad, then Library school and started working at the [academic institution]. And I would say the huge feeling of imposter syndrome like, attending those seminars, the first years there and the grad students were my age and I don't know you feel totally out of the loop, So, not having the chemistry background really, I think makes you feel. I guess reducing amount of confidence that I had in my ability to be able to provide instructions support, but I will say over time as I started to learn more about what the researchers and students were really doing in the department and what their needs were with respect to reference, information literacy, later on learning about the publishing system and Open Access and Research metrics, ORCID profiles and starting to see areas that the library operates in that there was also that same need in the Departments that kind of gave me confidence because I found out This is an area that I kind of have expertise right coming from the libraries and this is something that there's a true need so after doing a bit outreach I can kind of see that if I lean more into those areas for support that is an area that I can speak with some authority and some expertise and that gave me the confidence to be able to do that Outreach and deliver those services.

[Participant 7]
So, for me at least there is a change over time. I think naturally but also the confidence changed as I went kind of leading more into those areas that I felt I had more expertise in areas that were valuable. So, I guess to maybe this is taking a different path. Right, I'm not leaning into my ability to provide expert chemistry reference to the department. I don't think that has ever been the case at [academic institution]; my predecessors didn't have a chemistry background. So, I don't think we ever really went down that path of providing kind of very in-depth consultation for chemistry reference. But we are comfortable. But I am comfortable enough now to be able to do, some fundamental or basic reference to offer undergraduate level information literacy support with SciFinder and then again more into those more subject agnostic research supports that again those are areas that our researchers definitely value a lot. They look to us for that expertise and for that guidance around Open Access publishing and research metrics and profiles and that's something that I think also to them that has a direct high-end to the research and a way that we can help them. So my confidence has definitely increased over time, but I also find that for me, I don't get those requests really for consultations that are more nuanced and complicated for chemistry, but I'm also not kind of worrying about trying to get those which perhaps might be, not if that's not the greatest thing, but the need hasn't really been made for us and I would say we do have a relatively good relationship with the library, with the chemistry department now. We've always had a faculty member who has been tasked with being the Faculty bibliographer who's essentially their contact, their liaison, to the library and he's very active and suggesting things for the collection, but also kind of highlighting the needs that we have. And I think the relationship is pretty good. I think we're meeting their needs relatively well, but again, it's very much focused more and I would say the publishing side. Because we have that, because that's an area I definitely know a lot more about, have expertise have more confident in that and that's grown over the years.

[Facilitator]
Yeah, that makes a lot of sense and that it would be different depending on the person in the role. [Participant 1], do you have thoughts on how confidence might change over time?

[Participant 8]
I think when I started I taught a lot of the traditional tools for that time period like Bornstein, Beilstein, Gmelin. SciFinder or whatever it was called before. Chemical Abstracts. So, I taught those traditional tools. And because I worked in Labs. I worked either after school after classes or during the summer, I always worked in a lab. So, I had used those tools for my own research and lab work. So, I was confident coming in and continuing that kind of use in my instruction.

[Participant 8]
So, I guess it's called Reaxys now but Beilstein, Gmelin used to have this amazing course that you could take and so I took that course and it was phenomenal and it lasted a year and you had to send in assignments and stuff and you got feedback.

[Participant 8]
I noticed now that not a lot of Institutions still have Reaxys or a lot less institutions do. I'm not sure whether SciFinder has filled that gap or some other tool but that is definitely like, I noticed kind of a shift away from needing that kind of skill. Let's see. I did have a question from the chemistry department at [academic institution] that I didn't know the answer to. They wanted to know, so if we're moving towards an Open Access

model, then we should be making data accessible in an Open Access Repository. So, the question is for every type of instrument, you have a different data format. What are the Open Access Data formats? And how do you get them there?

[Participant 8]
And ASCII text is not a solution. That was a quote from the chemistry rep. The chemistry faculty rep said ASCII text is not a solution. So, they asked me to answer that question at a department meeting, to give a presentation about it. And so that was a question I did not know the answer to and it actually took me quite a bit of time to solve that kind of question.

[Participant 8]
So, that was new, I totally had no idea. I thought that was a really good question. I understood why they had that question, the more you dig into it the more you realize we're pushing Open Access models for data, right, but the field of chemistry isn't there yet? Right, in terms of what we have, we have the Research Data Alliance. We have the big German group so we have separate groups working on these data formats, but there is no clear answer. It is no wonder people have questions, right? So that was really interesting.

[Facilitator]
And how did you feel taking on that question?
[Participant 8] I thought it was super fun. And I like questions where it's clear why they have questions and they are very invested in that answer. Because if we're moving to data management plans required for NSERC funding it really does matter. You really do have to have a solid plan for your data. And then they also had some questions about data management plans. And so, I actually work a lot with data management plans, but the US is further ahead than we are in Canada. So, I think I kind of frightened the department because my experience is based on how data management plans are used in the US where they are much further ahead.

[Participant 8]
So, that was something I had to adjust my thoughts on. Here's what they're doing in the US. Here's what the best practices are. Here's my experience about why we should be using it this way and then there's these traumatized people who've never used a data management plan. I was like, Okay. I got a dial it down a bit but you really start working with data management plans, especially if you parachute into a team and then leave, the data management plan is really super important. It's not just this make work thing that from a Department's perspective often feels like make work thing, that from a departments perspective often feels like make work but once you get used to using them you really do see the value.

[Facilitator]
I agree with that 100% And I have also been asked not to talk about them in faculty meetings because of the fear, on occasion. I can totally see both of those perspectives.

[Participant 8]
Especially for me as a freelancer is, I come in at different points of their research data management cycle. So being on boarded onto the data management plan and having an off-boarding process, that's a lot of my life so for me it's really important to come in and leave and be able to leave with people knowing what's going on, but I can understand it does feel like make work and the beginning and you already have a million things so I get it.

Question 3
What strategies could help academic librarians gain further disciplinary knowledge, experience, and expertise?

[Facilitator]
Awesome. Thank you for that. That was great. So maybe now we can move on to question number three. So, this is about kind of looking forward and how we can do better. What strategies do you think can help academic librarians gain further disciplinary knowledge, experience and expertise or even perhaps just confidence?

[Participant 2]
The way I'd put it, like time and resources. There's lots of things to do. Yeah. I have in the past put, like, you know, do a first-year chemistry MOOC in my annual goals, just to, you know, because I took first-year chemistry like, oh, I took first-year chemistry in the 90s and then it's been a long time. So, you know, just to remind myself of those like foundational concepts. But that requires a lot of time.

[Participant 1]
That was on my to-do list the last year was just sit in on some lectures and do some MOOCs, and there's just no time with all the different leaves and areas. But I've looked at syllabi, looked at lecture slides just to get a general sense of like, what are they talking about? Can I try and tie that in? Other liaisons' LibGuides have been fundamental to helping me figure out just what resources I should be thinking about and you know, I can cater those to my own teaching. I'm trying to think, what else have I looked at? I'm on listservs, I'm in like a STEM Discord server. So again, that's kind of the liaison networking piece. And even just talking to faculty and being like, hey, I acknowledge I'm kind of new to this. Here's some ideas I'm thinking about, do you have thoughts about what directions I can take this or does this make sense as an example for your course? And they've been really like kind to give me guidance or to affirm like, yeah, that totally works. So that's been really helpful. So, I would say there's kind of the colleagues for liaisons and then there's faculty and then just professional networks outside of my institution as well.

[Participant 2]
Yeah, I agree with all that. I don't have another, I'm the only chemistry librarian at [academic institution]. There's only two or three, depending on how you count it, science librarians. So, we don't we don't have like, I don't have a lot of colleagues to draw from, but I do, [place name] does have like a science librarians' group that meets up and has a listserv, and so often I connect with my colleagues at {institution name] and other institutions. As well as like the number of times that emailed that like chem librarians like CHMINF-L, like just the most absurd questions. Someone's asked me this and I don't know where to start. And they're like, whoever's asking you is not being helpful, like –

[Participant 1]
Email the collective, help please! Oh, that's so useful.

[Participant 2]
And they're fantastic, right? I've had people ask questions that are like chemically impossible, and I've been like, I'm pretty sure that this is not a thing, but then I have backup. And they're like, you're right, this is not a thing.

[Participant 1]
Validation, it's always nice.

[Participant 2]
Because I don't have the confidence like in my background, right? Like in like chemistry, so I'm like, I don't think this works, but like this grad student is telling me that they're looking for it. And you get someone who's been a chemistry librarian for 100 years it has their PhD. Chemistry, they're like no, like, that's, you're correct.

[Facilitator]
Yeah, there's always that stumper like impossible question that comes up once in a while and you can, you can never fully prepare for it I feel like.

[Participant 4]
I think the email listservs I see. Some email lists are very helpful. We always see the questions coming from other librarians. I didn't respond to the emails, but I did some searches every time when I saw a very interesting question maybe on some vendor. Previously we had Reaxys, then I searched for those questions too. The email lists are very helpful. I've found CAS has very good tutorials. Starting from the time I was at [Company Name] I

used the CAS website a lot for STN and training and later when I was at [Name University] I also watched the tutorials for some vendors. So, I feel, very, very useful.

[Facilitator]
Participant 3, is there a way to overcome not liking agriculture? If you're stuck with agriculture?

[Participant 3]
Well, you can always find a hook. My background is in history, my 1st degree is in history so I kind of approached chemistry from a historical point of view. So, in the first couple of years I was the chemistry librarian I read as much as I could about chemistry, the history of chemistry, biographies about chemists, how the discipline developed, things like that. And if you can find a way to kind of connect with the subject, either through your personal interests or your other backgrounds that helps. I started as a librarian in [date], and today [Participant name] was mentioning there are so many wonderful resources out there, from CAS and vendors and on YouTube. Hours and hours and hours of tutorials that other librarians and other chemists and vendors have produced. It's very different from the nineties when there wasn't very much stuff like that unless you went to a conference and took a workshop or went to a training session offered by a vendor. I think today, young librarians today, really have lots of ways to learn that we didn't have 30 years ago.

[Facilitator]
I think librarians can really use that advice.

I realize that I have used that without really thinking. I know when I was given physics, I wrote something on women in physics and now I put together some research on women in physics. And then also we have Newton's copy of optics with his handwritten notes in it. I put together a history of physics page to kind of connect physically with the things. And gave some tours of Rutherford's equipment.

[Participant 4]
My background is STEM but I was doing metallurgy engineering, and we did learn a lot of chemistry but we focused on inorganic chemistry. And while I was a chemistry librarian at [Name University], to be honest lots of questions were related to organic chemistry. And I think I actually also learned a lot during my time at [Name University], because even I learned chemistry a lot but not focusing on organic.

[Participant 6]
Uh, there's that community of practice. We talked about, that's helpful. You know, I did my fair share of reading too. You know, I did look up articles about information literacy for chemistry. I scanned other library websites, library guides looking for tips, that sort of thing. All that legwork you know really help me. I think if you can find an ally in the chemistry department too, like if you can seek that out, that helps but you know they come and go sometimes. If you can find an ally and then if you can get your foot in the door, then that can be helpful. So, finding that ally is the challenge sometimes but if you can do it, yeah, it's a good thing. Sometimes [gaining further disciplinary knowledge, experience and expertise] just means perseverance.

[Participant 5]
Yeah, that's interesting, that hadn't occurred to me, but I think I kind of did that or that sort of happened, right, it wasn't anything I planned, but I did [seek] those relationships - those kinds of relationships are important.

[Participant 6]
What it was for me? It was [building upon] regular conversations. I saw this person on a regular basis. We saw the cyclical nature of the work academic on an annual cycle, but other cycles too, right, ICAP cycles and new batches, student cycles and cohorts and thinking in that way. This person was teaching the capstone, the chemistry capstone for owners. So, there was a more library component to it. And more research… to the work that was being done. And so that was a good fit. Yeah… I also read like crazy.

[Participant 5]
It was just part of my job to know. Not exactly what somebody's talking about or how to do what they're talking to me about, but to know what they're talking about and that was a challenge at first. But I realized I knew more than I thought I did. I had to read that much to know and gain that confidence.

[Participant 8]
So definitely take classes like that. I took this a thousand years ago, the American Chemical Society has a chemistry librarian Workshop people could take… I took that. The Intellectual Property Institute of Canada has excellent patent courses. They are, in my humble opinion, the best opportunity to learn patents at a very nuanced level and it's like a self-study course, but you're paired with a practicing patent lawyer who you can ask

questions of. It's amazing. I've taken all the classes in the patent administrator program and I feel like not enough Librarians know about this if you want to build confidence and patents. This is the way to go.

[Facilitator]
Neat. I didn't know about that.

[Participant 8]
And you're paired with an actual practicing patent lawyer to answer your questions. So, you can really get nuanced answers in terms of your understanding. I'm not going to lie to you -it is dry material. like it is a slog but you absolutely will understand not just the Canadian patent system, but the international patent system, you're really going to get it. And I think also I miss the OCUL chemistry librarian meetups, that's originally how I met Ian. I think those are great in terms of networking so that you do have someone to ask the tough questions. I was even still a part of that when I moved to [academic institution] and [academic institution]. I still kept up with the OCUL chemistry Librarians group. I think that's really important.

[Participant 8]
And of course, the chem info list, you can connect with really knowledgeable chemistry Librarians across Europe and North America And I guess there is no substitute for just slogging through tough questions, right? It's not sexy but there's nothing like learning the hard way.

[Facilitator]
Yes, experience is a great teacher. [Participant 2], what about you? What strategies would you suggest?

[Participant 7]
I mean if people haven't taken a chemistry course before I would recommend that they do. At most institutions, most librarians can take courses for free at the University and I would say even though I only took four undergraduate chemistry courses, I would say that the knowledge I got from those are surprisingly very useful and applicable to chemistry librarianship. Even if it just comes down to basic fundamentals of nomenclature and how reactions work. It just gives you the language and the terminology to do basic work with the department. So, I've been fortunate to have that already, but if I hadn't that's probably one I would have likely done.

[Participant 7]
Otherwise, looking out for opportunities for public events in your departments are good ways to get some knowledge and the discipline even if it's extremely high level, but it just kind of gets you an understanding of what is happening in the department.

[Participant 7
And I think that might be a chemistry culture thing where they tend to have all these symposia or maybe just the Sciences. I know that when I was doing undergraduate studies in the biology department it was the same and those are always open. I started doing a little bit of patent work in the past, patent reference I would say in the past. Or a few years ago when I did have to slog through that. I didn't know about these workshops or this training program, but I did do some online training from maybe it's the UN or this International patent agency or office that has some online training resources. So, I guess looking out for intellectual property pattern type material from government and maybe a non-governmental organization could be helpful.

[Participant 7]
And then I would also reinforce the Chemistry Librarians listserv or group I guess in Ontario has been very helpful. And so, I haven't used the chem info one as much but it has been good to just touch base with other chemistry Librarians in the province so that's also been helpful. I think when it comes to disciplinary knowledge and experience or expertise, I haven't done much to kind of further that since I've been here aside from the things I've talked about which are actually focused on what's happening my institution, learning about patents which are relevant but maybe not strictly disciplinary. And so on.

[Facilitator]
That makes a lot of sense. And the idea of taking a course, even if maybe you are in a bit over your head, just gets you more into that environment instead of getting an idea.

[Participant 8]
I don't know. I would have to but if you took a first-year class I don't know if that would really help you, like it's like stoichiometry, acid-based reactions. I'm not really sure that would help. I don't mean to sound negative, but I'm just thinking - so I paid for all of my degrees, including Library school, by working as a TA in the chemistry department. So, I did first year chemistry for a number of years as a TA and I'm just thinking I don't know if that would really help. I'm not really sure.

[Participant 8]
Yeah, it's fair. I haven't gone through the work of doing this for professional development purposes. I feel like the reason why I know how to use SciFinder even in a basic way comes from my knowledge of nomenclature, which is essential for that and understanding chemical substances, or elements and all these things and that kind of knowledge, if you haven't had science training or education, even in Ontario you don't have to take science up until grade 12, right? I think there's just knowledge that some people who are doing this job would be missing. I'm not sure you're right, if you took one the first-year chemistry class just first section. Would it be necessarily helpful for what we need to do? I'm not sure, I guess I just look back to my knowledge that I have. I think it comes from those four courses and I think that's where I've had some help so I'm not sure if it would be helpful professional development wise, I would assume it'd be helpful professionals on the wise to take courses as you're learning or as you're working. But are you saying that maybe the first-year course isn't relevant? Would the organic chemistry courses in second year be more relevant?

[Participant 8]
I think I mean, you can't get further along without taking the first year, but maybe the better direction would be to take the chemistry information workshop from the American Chemical Society, maybe that might be a bit more helpful. I mean it's been a thousand years since I've taken it, but I remember at the time it was geared for people who did not have a chemistry background.

[Participant 7]
I feel like I never heard about it to be honest.

[Participant 8]
It was probably because I've been an ACS member for a long time maybe and so then they barrage you with emails.

[Participant 7]
Do you find being an ACS member helpful?

[Participant 8]
Kind of, in a sense of, you kind of see the bigger sort of issues and what they're wrestling with as a discipline. Especially any of their struggles with diversity, equity and inclusion issues, that sort of thing. It kind of gives you a higher overview of what's going on.

Question 4
Academic librarians in this study were found to be spread too thin when covering a multitude of other subject areas, management responsibilities, covering for colleagues, providing STEM instruction, and research.
Can you comment on this?
Does this resonate with you?

[Facilitator]
So, I think that brings us well to our next section. So just kind of looking at where people are at in terms of their roles and how that impacts how they support chemistry. So, we heard from only one person who has chemistry specific like only chemistry job title. We had a bunch of folks who are like the STEM librarian or STEM liaison librarian or the physical sciences librarian, where they were covering a bunch of different science areas, including chemistry, or if they had a bunch of areas listed. People with just general librarian titles like construction librarian or liaison librarian or subject librarian, and then some people who had a functional title around the things that they do so maybe like RDM librarian, school comm librarian, and then we had a couple people who had sort of a compound of two of those so both, maybe both the RDM and the STEM liaison librarian, both in their titles, and then some people were had administrative titles so they were like the interim head of this library or things like that, that indicated more their administrative oversight of a unit. So, an interesting spread of people. And kind of going along with the different role titles they had, a lot of people had different responsibilities, sort of in addition to their chemistry librarian role. So, in addition to, some just had liaison, chemistry liaison responsibilities, they mentioned. A bunch of people had those other liaison, other liaison areas. as indicated by those compound titles. We had some who were both doing a functional area and covering chemistry, and then some people whose responsibilities were specifically functional, but there were supporting chemistry in that. And then of course, those administrative folks who are both kind of overseeing a space or overseeing staff or a unit as well as covering chemistry. Yeah, so, to go along with this, we found that people were spread pretty thin in covering multiple subject areas or having management supervisory responsibilities, maybe stepping in for colleagues while they are away, providing STEM instruction and research maybe to multiple areas. So, do you have any comments on this is this feel like it resonates with you?

[Participant 1]
Am I nodding my head enough? Definitely resonates for me, so one of the reasons I came into this chemistry liaison role is because our previous liaison covering that kind of [STEM department] portfolio was switched to a functional role to support research and scholarly communication on campus. So, we actually lost an entire science liaison portfolio and that came on me and was not like distributed. So, I kind of had to absorb all of that on top of already being run thin. And we have, I would say two, two and a half other science liaisons on our campus who are all run ragged at this point. So, I think we're all just tired and overworked and trying to prioritize where we see high impact and what we can be thinking about maybe is continuing just to not burn out constantly. So, I think this is, it seems to be resonating with a lot of folks and the other challenge at our campuses is you know, even in cases where we're not able to find coverage between the three or four of us, there's just lack of science lingo and familiarity with science library resources across our liaison programs. So, trying to find coverage sometimes is really hard and we have to say no to things that would be really nice not to say no to and just trying to make the case for why we need more science librarians has been really challenging. So, I think this stuff it resonates especially like on the teaching piece and the research consultation piece. Just looking through the question if there's anything else I wanted to speak to. Yeah, I think that's the gist. I'll pause there.

[Participant 2]
I mean, similarly, I cover five subject areas, statistics and actuarial science was added to the portfolio, a number of years ago when someone retired. It's like this is also what you're doing now. I had to Wikipedia actuarial science, which is like actually business and is like, for me the most terrifying part of the portfolio. I'm like please don't ask me these questions. I don't know how to answer these. So, I don't have like a, we had a functional model, like a cross-functional model for a while that was, that flamed out really badly. So, I, we do have functional librarians, but we don't, we don't sort of both do, I don't do both liaison and a functional role, but I, we do all our collections, at [academic institution], I know that's not true everywhere. So, for me, actually collections take up a large chunk of my time. I think because I've got some subject areas like math and physics that don't ask a lot of questions or have a lot of demands for instruction. But yeah, there's always stuff to do, right? How much research I want to do is up to me. I can do my own research so I can prioritize that or it gets shoved down the bottom of the pile. Same with external, like committee work, either throughout the institution or externally, external to the institution. It's those are two things that are like important if you want to get promoted, but are not important on paper, like for your day-to-day work. So, you have to make them happen yourself. Right? They're not explicitly valued by the organization, right?

[Facilitator]

Yeah, yeah, they're valued as far as they get you promoted, and they need to be there. But yeah, beyond that. [Participant 2], you said you got a functional model, briefly. Did you were you part of that where they tried to turn your team functional and then and then it went back? Tell me more about that.

[Participant 2]
Yeah, so I was like, I was put on the scholarly communications team, while still also being the liaison for all these areas. And it just ended up being, like, I guess I was also on the collections team, but the collections team literally never met, like it was just it was not well implemented. I think it can be implemented well. It was not implemented well for us. And we rolled it back after like a year. It just was like, it did not, it did not work, in our context, split across three branches. It just, some teams met constantly and did a ton of work like the instruction team and others, others barely did anything. It just was inequitable in terms of workload, and so, yeah.

[Facilitator]
Do you feel like, [Participant 2], having been in the field for a while, do you feel like we've always been spread thin or do you feel like this is a problem that that is growing, or is it something we've always been struggling with?

[Participant 2]
I think it's something we've always struggled with, but we struggle with it in different ways. Like it used to be we were spread thin because we spent like 10 hours a week on the reference desk and we tried to balance everything else. Right? And I think now we're taking on more like big, thoughtful projects that are maybe more mentally demanding. You know, like, we used to be quite happy like dropping in to do, well not we were never happy, it never felt great, but to do one shot classes, right? And that's way easier than being, than thinking like, critically about curriculum integration. Yeah, so I think that the things we're doing now, are more, more mentally and probably emotionally demanding. You know, like the growth of systematic reviews, which is something I don't interact with, but like my health science colleague sure does, you know, like, that's intense, right, in a way that just was not a thing. really, like 10 years ago, right? They existed, but librarian involvement was nominal, right?

[Participant 1]
The amount of time I spent trying to convince students and faculty to not to do a [knowledge synthesis] project. You don't need to do a systematic review, it's ok to not do one! Yeah, and if I could give a follow-up comment, just something I've observed in our own library is, in order to have departments, and just the campus as a whole, understand the library better, is we're getting involved in projects just outside of the library. So, thinking at a campus level, making sure we're at tables where we should be represented and be involved in those conversations, that is big, like reflective, mind-heavy work, and a lot of, how do I say this? Not convincing, but like demonstrating value and finding places to insert yourself it adds a lot more work. It's very valuable, and I think it opens up lots of partnership opportunities. But it does add that extra demand so that's something I'm sure a lot of libraries are experiencing as well.

[Facilitator]
Yeah, once you've succeeded in demonstrating your value, you get asked to do more things. Which is great. It's good. That's what you want.

[Participant 1]
But also, yeah, like blurring those boundary lines and like, where should we be pursuing that impact and what should our priorities be is a balancing act.

[Participant 2]
I also want to add that we're doing it with less resources. At least we are like, you know, we're hiring a librarian right now. An undergraduate engagement librarian, it was supposed to be two. You know, we've given up a lot of things to make that one position possible. I'm trying to cut with, you know, with my colleagues, we're trying to cut $800,000 out of our collections budget in the coming months like. We don't have, we don't have money for the staff we need and the projects are getting bigger and we're also looking at other ways to cut so it's, which is emotionally and intellectually draining right. And so, we don't have bodies to throw it problems the way we might have. In past years. We used to hire co-op students or like new grads on contracts and that's all, that's all gone.

[Participant 2]
I always tell people who are new, like I when I was acting head someone backfilled for me right and I actually had a couple different people backfill for me over the three and a half years. And I was just like, it's okay to not know. But just be open to it. Right? Like, you don't, don't be afraid of it. Just because you don't know. I mean

you can be afraid inside, that's fine. Don't let that fear shut it down. Don't let that fear shut down your instruction or your research consultations or whatever, just be like, approach it as you would approach any question in any subject area that you may not be familiar with. And if you're not, looking at Wikipedia, you know?

[Participant 1]
Google, help me! Definitely done that. I think like reframing has been super helpful, kind of what you're alluding to [Participant 2], so like moving from a fear mindset to a growth mindset and like giving yourself that grace to have that room to grow and you know, at the end of the day, I'm not there necessarily to be a chemistry expert. I'm a librarian and the library expert, so there's ways for me to kind of be in the middle of those two things and yeah, it comes with time and it'll be okay.

[Participant 4]
When I was at [Name University], on the teacher learning team, I was covering all the STEM instruction and the reference. I advocated for an additional librarian for the past 5 years and I didn't get any response. And no action on that. So, I can say yes, the workload is too much for individual librarians.

[Participant 3]
Yeah, and it's not just that librarians are spread too thin. We're understaffed at my library and end up doing some work that might have been done by a library technician. You just have to do it and so you step in. This is unfortunately very true.

[Facilitator]
Is this a change?

[Participant 3]
Well, at my library yeah, because when I started here 20 years ago we had 155 staff and it dropped a few years ago to 92 so we eliminated quite a few positions. Not librarian positions, but technician positions. And then our new UL who's been here 2 years, they started to hire more staff. And so now we're up to about 115 staff. And we've hired more librarian positions too. So that's good. That's certainly helping the workload issue. But unfortunately, now we're also in a hiring freeze. Because of our budget situation. All hiring has basically stopped. We do need to continue growing to try to get that workload under control.

[Facilitator]
There were never functional groups when I started almost 20 years ago as a librarian. Are these research data management, OER, are all of these just new jobs? Why do you think liaisons are taking on functional roles?

[Participant 3]
I first heard functional teams maybe about 12 or 15 years ago. And it was around the time that open access scholarly communications, data management, all those things were starting to emerge. And I think what happened is that university deans of libraries couldn't or didn't want to make the argument to create new positions to support these roles and so they just cannibalized subject librarian positions. And they said, okay, well, we're not going to do subject librarianship anymore. We're going to do functional roles. And now what I've seen in the last 4 or 5 years is actually subject librarians coming back strong. I mean, I have never seen so many ads for subject librarian positions as I have in say the last 3 or 4 years since the pandemic.

[Participant 4]
I think [Name University], they saved a lot of budget because of the change from liaison to functional group. And as far as I know, [Name University] didn't replace some positions, then they thought about functional groups, then just made the change and they saved the budget.

[Facilitator]
Okay, they saved the budget by?

[Participant 4]
Cutting people, cutting librarian positions. So, for example, when I joined [Name University] we had the physical sciences and engineering team at [Name Library]. At that time, we had, I think, 5 librarians on the team and 2 library assistants. Then, in a functional model, just one teacher learning librarian for STEM, just me, and one librarian for collections for STEM. And I think that's it. Just 2 librarians to serve STEM. In terms of collections and the teaching and reference. So yeah, cut 3 people actually.

[Facilitator]
The work is still there, but everyone has to cover the same work.

[Participant 4]
Yeah, just like I'm the only one to cover library instruction for STEM. Then the other librarian is the only one to cover collections for STEM. So that's it.

[Facilitator]
I know at [Name University] we closed a lot of libraries. Even though of course the student body just grows over the years. There've been a lot of closures of spaces and then libraries merging to save money. There are just less librarians because yeah, just close an entire library. They closed the medical library which was a big deal.

[Participant 3]
In [Name University] we've grown. When I started here, we were around 22,000 students. And now we're up to 32,000. But we have about the same number of librarians.

[Facilitator]
Chemistry specifically has grown a lot at [Name University]. Just as an example, the course that I would give instruction for was 600 students and then 800 students. It's over 1,000 students in one course. When you have 1,200 students in one course, a librarian cannot teach each student. I used to go into the lab and give them each a session and it's just become impossible. But they still all have questions. So, whenever departments and or faculties do pushes for more students, we don't do an equal push for more librarians.

[Participant #4]
Actually, at [Name University], some library assistants are already involved in librarians' work because it is pretty hard for librarians to cover all the workload. For example, before I came to [Name University], I was the acting director at the [Name Library], and, in that library, I was the only librarian plus the director in that library.

Then when we had the teaching requests, the teacher learning librarian covered too much. Even in social sciences they have 2 librarians to cover social sciences but still too much. Then as the director I should also go to the classroom to teach. I brought the library assistants to teach too because we have like 800 students in the IEEE course and like 10 sections. So even library assistants need to do the librarian's job. They don't get the pay but they have to because of the workload issue and the staffing issue.

[Facilitator]
Do you think our situation is unique? With our functional teams and our spread too thin.

[Participant 3]
No, I know US schools that have gone down the functional team road. And yes, spreading too thin, that's universal. To be a librarian is to struggle to provide adequate services with inadequate resources.

[Participant 4]
So, will [Name University] go with the functional group model?

[Facilitator]
We haven't heard anything about it. We have 2 science libraries. I'm at the Physical sciences, life sciences and engineering library. We have 11 librarians but most of them are on the medicine side. But we don't have any functional roles so far. But yeah, I'm curious.
[Participant 3]
I feel very good at [Name University] with our new University Librarian because they have created subject liaison positions. And they have spoken in favour of having subject librarians, so I think as long as they're here, I think we'll be okay.

[Facilitator]
I wonder if there is anything very Canadian, do you think, about our situation as chemistry librarians?

[Participant 3]
Well, the accreditation standards are terrible. When you compare the Canadian chemical institute's accreditation to ACS. I mean, I'm always pushing ACS because that's so much more substantial than CIC.

[Participant 6]
I think I would agree. I think a lot of us are spread too thin. I'm not a learning liaison librarian for all sciences, so that's just the way it is. There are four of us, so there aren't many of us and then we also have our own professional duties. We have university committees we sit on because librarians are required to sit on some committees, and there's only a few of us. You end up like the rotation that isn't fast.

So things like the university's personnel committee, you know that's takes up a lot of time. If you're on that committee and then there's our internal committees. So yeah, I completely can relate to being to being stretched, you know we're stretched thin. I feel [that] it's just something that you just learn to live with. It's just the way it's been. I think it seems like that's the way it's [always] been, at least where I am. I kind of feel like I learned a little bit of [providing instruction and research support] this for now, and then I put that away stored away until I need it again, and it's hard to become an expert at everything. I've learned to be like that… in some areas.

[Facilitator]
I'm saying "it's hard to be an expert of everything?"

[Participant 5]
I say yes, but let me explain a little bit and I won't go into too much detail, but I'm sort of freely negotiating my relationship with my career and my institution 10 years in as people often do. Umm, because I was all about achievement and threshold crossing… that is less important to me now or I'm not getting the return on that effort that I would like to see, and maybe I'll put my efforts somewhere else. I don't know what any of that is, but I have always felt like I've been spread too thin and I think that is it's difficult for me to say [that is may be] more self inflicted than I thought in retrospect. So, I could have allocated my time differently. There is a little bit of invisible labor there. There's a little bit of vocational awe. There're a few other things going on, right? I'm a deeply curious person. So, you know, rabbit holes are fun. So, all of that is to say that yes, "I'm spread myself too thin." Probably more so than I needed to, and I am clawing back some of those assumptions and reassessing what it is [that I do]. That is curiosity. What it is that is nothing to do with either one should stay inside the building when I walk out the front door. I don't have any answers, but it's [interesting]. That's all I can say about that.

[Facilitator]
I'm going to move on in interest of time. These are some examples what job titles that Librarians held - some are chemistry specific. We have science specific and some general Librarians, some functional, and then then some compound and then administrative. So, there's a wide range and then we're also asked about responsibilities in addition to the roles as chemistry librarians. And so, a number of people had other liaison areas and a number of people had additional functional responsibilities as well as Liaison roles. [Participant 7], you mentioned that your model is moving but it also sounds like even in a liaison model you have also talked a lot about functional area responsibilities as well. Generally, most of the Librarians are mentioned as being spread too thin and covering a multitude of subject areas and responsibilities, management, as well as covering for colleagues. Can you comment on this? Have you had this experience? Does that resonate with you? I know at my small institution, it definitely resonates with me. What are your thoughts? [Participant 7], why don't we start with you?

[Participant 7]
My title is [title name] Librarian. So yeah, you could infer that is my primary focus these days, which wasn't always the case. This has been the case for the last three years; I'm very focused on electronic resources for the whole Library. So, the chemistry librarianship is now a secondary responsibility, to be a liaison. So yes, I would say for sure I am spread too thin in both my functional and also for supporting teaching and in reference work. I'm not doing as much outreach in my department as I have in the past because I have to focus on my functional responsibility.

I also have two other subject areas as well and it could be. It is the case that biology, for example, is definitely an area that I do a lot more teaching with than I do with chemistry. So, in my own mind when I like envision time management, it's like okay, I'm going to do collections responsibilities first, electronic resources, that takes the most of my time and to fill my other obligations, it's kind of easier to do that with biology department, biomedical sciences department than it is from chemistry, but also maybe the needs is more for those when it comes to teaching. I would say it does resonate with me. It definitely feels like we're being spread too thin. The move to a functional model will be interesting because with that I will have no I guess direct responsibilities for chemistry outside of perhaps collection developments. The way this likely is going to work is that to I might be the collections librarian for STEM.

[Participant 7]
So, I might be working directly with faculties but just on collections issues. So, I wonder what the future will look like. I wonder if I will have that perspective, that feeling that I am being spread too thin then. But it definitely is the case right now, at least at [academic institution], that you have several appointments. I also have this functional responsibility. It leaves less time to really think creatively and proactively about what does the chemistry department really need and doing that outreach more fulsomely so yeah it resonates with me for sure.

[Facilitator]

That makes sense. Me too. [Participant 8], does any of that resonate with you?

[Participant 8]
So, it definitely does in my previous role. I worked at the Center for Learning and Teaching Through Technology when I was at [academic institution] in addition to having my liaison responsibilities. At [academic institution] I was the head of Collections and then I also had seven liaison responsibilities. So, I was probably the worst instruction librarian on the planet and then when I was at [academic institution], I was the head of collections for the science library in addition to being the chemistry librarian. So yeah for sure it always felt like although I was hired for my chemistry knowledge, it was really a secondary kind of task for me. So, it was super fun going to [academic institution] where I wouldn't have those type of administrative duties. I thought I could just do chemistry and answer questions. But the model there is very different. So, any student can randomly book with you. So, I found myself doing systematic reviews a lot, which was not at all what I was hired for but I do systematic review stuff in my real-life job. So, I was fine to handle systematic review stuff, but that was totally not what I was hired for. Also, because I work in data science. I got a lot of math graduate student questions. So once again, I found that even though I was super pumped to be a chemistry librarian and live my chemistry librarian dream, the reality was different. I also created this course for generative AI prompt design, so I spent a lot of time on that. So once again, chemistry kind of got shoved a little bit to the side.

[Facilitator]
Even the best laid plans! could see that that can kind of work out that way.

[Participant 8]
Right, like no administrative tasks. It's going to be 24/7 chemistry. No.

Question 5
How might librarians incorporate artificial intelligence in instruction and professional practice? Can you give examples?

[Facilitator]
Yeah. All right, on that note, I think maybe we'll move on to the next question. So yeah, we kind of added this piece about artificial intelligence just because it's, it's the talk of the town lately. We're all thinking about where does it fit into our work? So, we wanted to know how chemistry librarians or librarians working with chemistry folks are seeing this come into their practice. So, we gave folks an opportunity to tell us a little bit about that. We had a bunch of people who weren't really using it, yet. We had some who said they're just not using it very much. They've maybe dabbled a little bit. A few people very aptly said they're not knowingly using it, but it may be coming into play in ways they're not aware of. People, 4 people making a commitment to use it in the future, even if they're not doing it right now. And then we did have 12 people who said they were using it in various ways. So, a couple of interesting quotations from that is we have one person who said that they use LLMs like ChatGPT to help them brainstorm search examples because they're not familiar with chemistry as much or they don't always know what makes sense as a search example, as I think [Participant 1] mentioned earlier, that can be a challenge, but they've had limited success. And then another person also using ChatGPT, but to compare different terminology, discipline-specific terminology to help them get a better sense of the vocabulary and the lingo that's used in their subject areas. So yeah, a couple interesting ways it's starting to be used. Oh, and then they also mentioned they've tried it for synonym suggestions. Some other folks are just kind of pointing to the opportunities and possibilities coming from AI, specifically for research, to widen the knowledge and curiosity of grad students and meeting their research goals. Someone else just looking to understand how AI works, when it doesn't, and when it's relying on bad or incorrect science, and that this is kind of the most important thing we need to be aware of right now. And then of course, someone acknowledging that AI is impossible to avoid because a lot of the things that we use already have AI embedded within it. So, some interesting perspectives came out of this question. So finally, we're interested in your perspective on this if you have anything to share, how do you feel like librarians might incorporate artificial intelligence into their instruction and professional practice? Are you doing this at all or has it has it touched or changed your work? And if so, can you give some examples of how you've seen this impact things?

[Participant 2]
So, I've used it, like someone said, to kind of generate lesson plans when I'm just stuck. Like sometimes like, I don't use it, I don't stick to those lesson plans, really, right? But I use it to just like, give me a framework to then build off of and, and change up, just if I'm, if I'm sick of the way I've been teaching the class and just want to change things. Like I said, I just need a different perspective. I need someone else to tell me what to do and then I'll be like, no, I'm not doing that part, I am doing this part. I think in the coming semesters, I'll start to have to talk, I'll have to start talking to students about it more. Just because the tools are, are changing so rapidly, like you know, in the fall I could just tell them like hey don't use ChatGPT to do your chem homework it like, is garbage for this. Just because it you know it has been shown to give all these hallucinatory answers. You know, but as more and more tools exist, I want to acknowledge them, right, and students will use them regardless, right and so I feel like just pretending they don't exist isn't helping anyone. So yeah, I think I'm going to have to start talking about them more than I have been.

[Participant 1]
It's been a slow reluctant process for me I would say. I haven't used it a lot in terms of just like my preparation for going into courses, but when I'm teaching workshops, I do try to approach it from just like a critical perspective when it comes to information literacy and like the number one thing is you know, there's so many sources that we can use in the sciences. What I want to emphasize is, what they are, what their functions are, when and why you should use them. So, when I talk about things like Chat GPT, I'll try to emphasize like this is a language processing tool. It is not literature searching tool, and here's some of the limitations that will come if you try to use it as a literature searching tool. So, I will flag some of the problems like hallucinations, that I ultimately can't control what you do, but there are other tools that I think will work better for your purposes and here's why and then I will go into my demonstrations. So, I do have a like ChatGPT and generative AI page that I put into my LibGuides. I don't spend a lot of time in class beyond just kind of that quick like here's some things to think about just because there's other stuff I need to get to in that hour. But if stuff comes up in databases, as I'm using them, I will try to point that out. So, I think it's Web of Science has like generated keyword suggestions based on ones you've searched already. To be like, here's why we're seeing this and here's some ways you might use that. But that's probably about the extent that I've done it. I have had faculty ask about doing little blurbs for its use as like a brainstorming tool for writing papers. But I'm very strongly against it as a lit searching tool at this point. So, I'm pretty firm on that when I go into teach classes and just trying to be transparent with students as to why I come from that standpoint and like some of the ethical issues that I still see in place and how this is so rapidly changing. So, I'm trying to stay afloat and address what I think is helpful just for them to be aware of, but it's, until some of that stuff gets resolved, I'm a little reluctant to like lean in too far

to teaching like ChatGPT in particular, those kinds of things. But for the database tools, I agree. It's part of the platforms we're using. So, you might as well talk about what they are and why they're there and how they can be used responsibly.

[Facilitator]
They're changing so fast too. There are new ones all the time. Yeah, even in our databases. So just trying to keep our heads above water.

[Participant 2]
Yeah, I feel like every time I'm like, okay, like this one is, like, useful, and this one's not, that there's like 40 others that pop up, right?

[Participant 1]
Where did this come from?

[Participant 2]
Like I can't keep on top of them all. And so, I agree with, with [Participant 1] that kind of just talking about, particularly ChatGPT and like Bard and some of the other like LLM, like sort of big models like that. Explaining why they're not good for literature searching is really helpful, right? Because otherwise students will be like, yeah, yeah, you're talking about Web of Science, but like I could just do this, right? But then also being like there are other things where it is integrated into these databases. So, making clear that we're not just like Luddites, you know? We're not trying to we're not just ignoring that these exist. This is why they're not the right tool for us.

[Facilitator]
Have you noticed you're approaching it differently at all for chemistry or anything specifically, to chemistry with AI that you notice, like, students working with it differently? Or are there specific AI applications for chemistry you've seen come up, different things you hear from your faculty?

[Participant 1]
Not for me, specifically, it's pretty standard across all my liaison areas.

[Participant 2]
Yeah, same.

[Participant 4]
I tried ChatGPT because sometimes I just give some questions and say, I want to find this, and actually ChatGPT gave me I will say the fake news. And I think it gave a lot of references to me, but non-existing. I just tested it. I haven't used it for my instruction and professional practice. I did use it to check my grammar. Yes, because basically, obviously, I speak English as a second language. So sometimes I just try to ask some questions, should I use this word or that word to match these contexts or something, but not for my professional practice.

[Participant 3]
I have taken little baby steps with AI. I don't really use it in teaching. I talk about it a little bit in the context of ethical research and attribution. Because most publishers, and I think virtually all the big science publishers, have said that AI cannot be an author, right? And it can't be an author because it's not accountable. And so that's something when I'm teaching, especially to grad students, teaching them about this idea that what you write you're accountable for, just as you're accountable in the lab for following the correct safety procedures. And also, in terms of intellectual property, if AI generates an idea or a patent application it can't own that. And so, it gets into some interesting conversation about who owns IP, who is responsible for the contents of an article or a thesis.

[Facilitator]
Do you see or do you get any questions about any AI tools for chemistry specifically?

[Participant 3]
I haven't yet. I've had a few people ask very general questions like, how will AI change chemistry, things like that, but nothing about specific applications of it.

[Participant 4]
Participant#1, do you have Reaxys at [Name University]?

[Participant 3]
No, we cancelled it about 8 years ago.

[Participant 4]
Same as at [Name University]. I think last time I met with their rep, their customer like salesperson, I think they mentioned they use AI or some type of technology in the database to do something. I kind of forget but we don't have access to the database.

[Participant 3]
Yeah, I think all database vendors are looking at it. I was in a user's meeting with IET who make Inspec, and they are planning to bring AI into Inspec.

[Participant 4]
Oh, okay, good to know.

[Participant 3]
I think all database vendors are probably going to implement AI at some point.

[Facilitator]
Yeah, like Scopus is with its beta AI.

Would you get general questions? I get general requests from professors saying, can you show my students some AI, because they don't want them to fall behind. They want them to know the latest stuff that is out there, which is interesting. Of course, AI is already used in a lot of patent databases because of the machine translation. And I know that there's a lot of predictive synthetic chemistry going on with AI. Yeah, but just showing some shiny AI tools is a lot what they seem to want.

[Participant 3]
Yeah, I don't know. I haven't had a request like that and I don't know if I would agree to do that. I mean, I'm still struggling to get everybody, you know, up to speed on SciFinder, right?

[Participant 6]
Yeah, I have that very [same] question. This is an area where I feel like I'm falling behind and I'm trying. I am feeling a little bit desperate about trying AI. Staying up to date with AI… this is something that we've just created a like sort of an internal community of practice, a trend, and we're starting this year and we're starting to share between each other information about AI and how we can use it. And so, I'm very much on the sort of the one side of the learning curve like I'm still learning. So, you know, and I've been playing with things like ChatGPT and learning how I could use to help students, you know, brainstorm keywords and that sort of thing. But beyond that, I haven't done a lot of exploration. I do a lot of work in systematic reviews. Well, not a lot, but I'm the [only] person who does it… I'm starting to kind of try and figure out what AI means for that work. So that's all I can really say about it.

[Participant 5]
So can I ask "When you say incorporate artificial intelligence into instruction and professional practice, do you mean use it as a tool or do you mean talk about the tool as a librarian to our audiences?"

[Facilitator]
Yes, I'm being I'm being intentionally vague [to say yes to both instruction and professional practice.]

[Participant 5]
I don't use it very much when I'm instructing, but I instruct about it if that makes sense. So as far as instruction and professional practice, we do have an internal committee… here on campus, and the library is actively involved in that. I'm not actually on that, but the person who does exactly the same job as me was sort of binaries here, right? We have backups and binaries. A person who does the same job is on that committee, so I have greater access to that information than most of the other people. I'm not on the committee, but I feel like I'm almost on it because we talk regularly about this. It is like anything else, it's a new tool. The problem with all of these large learning models is that they're pulling from the back catalog in the back catalogs. Pretty biased, pretty racist. Some of it's wrong. It's all written by the same type of person for up until very, very recently. Uh, so that's some of the issues that are around that and that that is slightly less of an issue in chemistry than it might be in some other subjects, but only slightly less like there's deep biases and sciences as you both know. So, I talk about it as a thing, as a reified thing, but I don't necessarily use the tools in instruction, but it's starting to come into professional practice. We're certainly starting to use it. We're practicing things like using it for taking notes,

meeting notes, and things like that, but internal meeting notes like, you know, low that we've recorded, these are low, low barriers and failure would be a minor thing. So early days here, I think so.

[Participant 6]
We've just been talking about using it to adapt some of our writing for that instruction program. I was telling you about and to check for language levels and that sort of thing.

[Participant 6]
Yes, to make sure we're not speaking at like maybe too high a level or using too much jargon.
So we've been thinking about, yeah, playing with it for that, but then editing so to bring back that human touch, I guess, yeah, I feel like some of my own personal thoughts on AI are or influencing ….You know what that I'm a little resistant, so I'm a little bit of a combustion. I think so, you know, been doing this too long. Maybe, I don't know.

[Participant 8]
So, I use it a lot for data cleaning. I am one thousand percent hardcore chat GPT for creating regular expressions for data cleaning. So, I'm so hardcore that when they release a new package for R studio you can… I think his name is James Wade. He's developed R packages that you can integrate generative AI through R so you don't have to leave it. And so, I did quite a bit of testing on a new package for him when I was at [academic institution] because the whole idea, for me the power is using chat GPT to ask questions of your own data. And so that's something that I'm really interested in. And so, I wouldn't say I helped a lot of chemistry students with their data using chat GPT.

[Participant 1]
And I want to say that I'm not using the open model of Chat GPT. I'm doing an API call that sort of thing and we're using representative data not their actual data, which you have to be worried that it is going to train the model. I taught students how to create their own representative data that's not related to their actual research data, but can be used to ask the questions that they have. And so, for that you need to be able to call the API model that sort of thing. So, I use it quite a bit. I created a prompt design course for [academic institution] before I left. I don't know. I think it's really powerful, specifically how I want to use it and using generative AI in data cleaning is definitely changing the data science profession for sure. The bulk of what we do in science is data cleaning and data processing and if we can offload that or make that faster, especially for creating regular expressions, then that gives us more time to be asking higher level questions of data and making higher level connections.

[Participant 7]
Yeah, I mean I would say I incorporate AI in my professional practice. I'm not sure how much I do it for chemistry specifically or my work with the Chemistry Department. I use Chat GPT, for example a lot, almost daily, and I use it to explore topics…Let me open up chat GPT to see what I've recently asked it…so I was working on a policy for our electronic resources, like helping guidelines for General acceptable uses for electronic resources. So, we don't have one right now. So, I drafted something on my own and I threw it in there and I started asking questions that helped me revise to come up with a final, good sounding one. So, I use a lot of copy editing I guess. I paid for the pro version of Grammarly to also do the same, so that has a built-in AI function to help you analyze what you're writing and suggest changes. So, I use it, I guess to help me with writing a lot and I use it to explore issues. So, I guess issues related to librarianship, issues related to just working. I also asked recently about the different forms of conflict management resolution, so in a way I guess I would have used Google in the past, I'm using ChatGPT.

I have also done a workshop on kind of instruction AI and literature searching. So again, not chemistry specific, but I did that to kind of force myself to learn about these eight new AI tools. They're coming out like these research assistants, like Elicit and Site and to see how those compare against traditional indexes. So, I ran a workshop on that and how to use it, ethically and critically but I wouldn't say, it hasn't really transcended yet to my work with the chemistry Department. I like the example of using AI to generate example questions, reference questions or search questions, you might use. So yeah so far, it's been limited to my other work that I do and more just I guess working in general, right?

[Participant 7]
And kind of these office skills, that's our soft skills like being able to write eloquent emails, and asking It to help me explore different questions I have. But yeah, nothing yet kind of with data. I mean, I do a lot of data analysis with my electronic resources hat on and I'm excited for the future. I'm going to learn how to use it more for those applications.

[Facilitator]

Thank you for sharing that.

[Participant 7]
And [Participant 8] also, great work. I remember your guide being posted to the AI matters most Forum. So, it's a really nice guide.

[Participant 8]
I have no idea. I literally shoved it at my boss and went.

[Participant 7]
Yeah, it looks great though. It was a great reference.

[Facilitator]
That's great.

[Participant 8]
It's really funny so one of my clients actually gave me feedback module by module on that and she had never used chat GPT. She had zero baseline. She was at a Christmas party with a lot of Amazon Tech Bros, and She answered their question. She's like obviously you're having problems with your context window and they were like, my God, you're so right. She was so proud of herself.